

## I CLAIM:

1. A method for detecting the angular change of a scanning device with respect to at least one scale of a position measuring system, the method comprises:

detecting several angular positions of said scanning device in relation to said at least one scale by detecting position measurements of said scanning device at several scanning points; and

determining a value for a chronological progression of a change in angular positions of said scanning device from said detected several angular positions of said scanning device.

2. The method in accordance with claim 1, wherein said value of said chronological progression is determined as extreme values of said detected angular positions within a period of time.

3. The method in accordance with claim 1, wherein said value of said chronological progression is an oscillation range of said angular positions formed from extreme values of said detected angular positions.

4. The method in accordance with claim 1, further comprising:

- a) simultaneously detecting a first measured position value of said scanning device at a first scanning point and detecting a second measured position value of said scanning device at a second scanning point;
- b) forming differential values between the simultaneously detected first and second measured position values at both said first scanning point

and said second scanning point;

c) performing several repetitions of steps a) and b) to form several differential values; and

d) forming an oscillation range as a value of said chronological progression of change in said angular positions of said scanning device from several successive differential values formed in step c).

5. The method in accordance with claim 2, further comprising:

a) simultaneously detecting a first measured position value of said scanning device at a first scanning point and detecting a second measured position value of said scanning device at a second scanning point;

b) forming differential values between the simultaneously detected first and second measured position values at both said first scanning point and said second scanning point;

c) performing several repetitions of steps a) and b) to form several differential values; and

d) forming an oscillation range as a value of said chronological progression of change in said angular positions of said scanning device from several successive differential values formed in step c).

6. The method in accordance with claim 3, further comprising:

a) simultaneously detecting a first measured position value of said scanning device at a first scanning point and detecting a second measured position value of said scanning device at a second scanning point;

- b) forming differential values between the simultaneously detected first and second measured position values at both said first scanning point and said second scanning point;
- c) performing several repetitions of steps a) and b) to form several differential values; and
- d) forming an oscillation range as a value of said chronological progression of change in said angular positions of said scanning device from several successive differential values formed in step c).

7. The method in accordance with claim 4, further comprising determining a minimum differential value and a maximum differential value from several successive differential values; and forming a difference between said minimum and maximum differential values that corresponds to said oscillation range.

8. The method in accordance with claim 7, further comprising storing said minimum differential value and said maximum differential value from several successive differential values.

9. The method in accordance with claim 2, further comprising creating a warning signal when said oscillation range exceeds a predetermined value.

10. The method in accordance with claim 3, further comprising creating a warning signal when said oscillation range exceeds a predetermined value.

11. The method in accordance with claim 4, further comprising finding successive extreme values in said differential values and determining a time between the detection of said successive extreme values.

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12. The method in accordance with claim 11, wherein an oscillation frequency of said scanning device in relation to said scale is determined from said determined time between the detection of said successive extreme values.

13. The method in accordance with claim 12, wherein said successive extreme values are each maximum values.

14. The method in accordance with claim 12, wherein said successive extreme values are each minimum values.

15. The method in accordance with claim 12, wherein said successive extreme values are a maximum value and a minimum value.

16. A position measuring system comprising:

- at least one scale;
- a scanning device that moves relative to said at least one scale along a measuring direction; and
- an evaluation module comprising:
  - a first module for determining angular positions of said

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scanning device from several measured position values; and

a second module for determining a value for a chronological progression of several angular positions.

5           17.     The position measuring system in accordance with claim 16, wherein  
said second module comprises a memory device, in which extreme values from  
several successive angular positions are stored.

10           18.     The position measuring system in accordance with claim 16, wherein  
said scanning device comprises at least two scanning points for scanning said scale  
and for forming measured position values, and wherein said measured position values  
are provided to said evaluation unit, which processes said measured position values in  
such a way that a value for said chronological progression of said angular positions is  
present at an output of said evaluation unit.

15           19.     The position measuring system in accordance with claim 17, wherein  
said scanning device comprises at least two scanning points for scanning said scale  
and for forming measured position values, and wherein said measured position values  
are provided to said evaluation unit, which processes said measured position values in  
20     such a way that a value for said chronological progression of said angular positions is  
present at an output of said evaluation unit.

          20.     The position measuring system in accordance with claim 18, wherein  
said evaluation unit is integrated into said scanning device.

21. The position measuring system in accordance with claim 18, wherein said at least one scale comprises two graduated tracks, which are spaced apart from each other transversely to said measuring direction, and respectively one of said scanning points is assigned to one of said two graduated tracks.

22. The position measuring system in accordance with claim 18, wherein said at least one scale comprises a first scale that is arranged parallel with a second scale on a first machine element, and said at least two scanning points are arranged on a second machine element, wherein said first and second machine elements form a gantry structure.

23. The position measuring system in accordance with claim 16, wherein said first module and said second module are formed in a common component.